

## REMARKS

Non-elected claims 1, 2, 13-16 have been canceled, and new method claims 17-19 have been added. No new matter was added. Thus, method claims 5, 6, 9-12 and 17-19 remain pending for further prosecution in the present application. Applicants respectfully submit arguments for overcoming the rejections based on the prior art of record. Accordingly, Applicants respectfully submit that the present application is in condition for allowance.

### **I. Claim Rejection - 35 USC §103(a)**

*In the non-final Office Action dated October 7, 2009, claims 5, 6 and 9-12 are rejected under 35 USC §103(a) as being obvious in view of U.S. Patent No. 5,336,386 issued to Marx et al. in view of JP 04-231461 A.*

Applicants respectfully submit that Marx et al. and JP '461 fail to provide methods of packaging a hollow cathode sputtering target.

The sputtering target disclosed by Marx et al. is a typical tabular or planar disc sputtering target assembled to a backing plate. In use, atoms ejected from the face of the target travel along a line-of sight trajectory to deposit on top of a wafer whose deposition face is parallel to the erosion face of the target. The tabular target of Marx et al. is very slightly concave. For example, as best stated on column 3, lines 7-9, of Marx et al., the target has a diameter of 10 inches and the radius of curvature at which the top surface is slightly concave is 67 inches. This slight concave erosion face of Marx et al. is still considered a tabular disc sputtering target by one of ordinary skill in the art and is certainly not considered a hollow cathode sputtering target.

The sputtering target of JP '461 is also a typical tabular or planar disc sputtering target having a backing plate. During sputtering, atoms are ejected from the face of the target and travel along a line-of sight trajectory to deposit on top of a wafer whose deposition face is

parallel to the erosion face of the target. JP '461 discloses a “cylindrical protector” (4) for use in packaging the target (1).

The above references fail to disclose a method of packaging a hollow cathode sputtering target. A hollow cathode sputtering target is term known by those of skill in the art to refer to a specific type of sputtering target. A hollow cathode sputtering target is a target having the shape of an inverted crucible or cup defining an inner chamber or sputtering cavity within the void of the target. During sputtering, magnets are mounted on the exterior wall of the target and create high density plasma inside the target, and the plasma contained within the cup-shaped target erodes the interior wall surfaces of the target. Magnetic fields are used to traject the ions from the sputtering target in a perpendicular direction to a substrate on which a thin film is formed. The erosion of particles from the sputtering target surface generally occurs in a relatively narrow ring-shaped region, called the racetrack region, on the inner sidewalls of the cup-shaped target. Thus, use of a hollow cathode sputtering target enables the generation of high density plasma within the hollow target and improvements with respect to the directivity of sputtering direction so that it can be used to fill via holes and the like of a high aspect ratio on circuit boards.

It should be noted that it is not possible to generate high density plasma within the shallow concave depression of the target of Marx et al. and that it is also not possible to improve sputtering directivity with the target of the Marx et al. patent. Accordingly, there is a significant difference between the tabular or planar disc type targets disclosed by Marx et al. and JP '461 and the hollow cathode sputtering target required by the method of the present application. It is simply incorrect and unfair to describe the target of Marx et al. as a hollow cathode sputtering target.

Applicants respectfully submit that the packaging method required by the claims of the present application, which is directed to a new method for packaging hollow cathode sputtering targets (not tabular or planar disc sputtering targets) would not be obvious to one of ordinary skill in the art in view of the packaging method of a tabular or planar sputtering target disclosed by the cited prior art. Further, one of ordinary skill in the art desiring to package the target of Marx et al. would simply follow the teachings of JP '461 and would have no common sense reason for altering or modifying this approach.

For the above reasons, Applicants respectfully request reconsideration and removal of the rejection of independent claim 5 of the present application.

With respect to claim 6 of the present application, it requires the cover to be transparent. As best illustrated in FIG. 1 of the present application, as filed, the cover is referenced by numeral (5) and is not the same as the resin bag (3). Thus, claim 6 requires the cover (5) to be transparent, not the resin bag (3). Marx et al. fail to disclose a cover of any type, and JP '461 fails to disclose, suggest or provide a motivation for providing a transparent cover or protector. For at least this additional reason, Applicants respectfully request reconsideration and removal of the rejection of claim 6 of the present application.

With respect to claims 10 and 12 of the present application, the cover is required to be a flat plate. For example, see cover (5) as illustrated in FIG. 1 of the present application, as filed. In contrast, JP '461 requires a "cylindrical" protector (4). This cylindrical protector would also be used by one of ordinary skill in the art to package the target disclosed by the Marx et al. patent. A "flat plate" would be avoided by one of ordinary skill in the art packaging the target of Marx et al. because the cover would likely contact the erosion face of the target which is provided with only a very shallow depression. Also, such a flat plate would certainly need to

directly contact and engage a peripheral section of the erosion face of Marx et al. which would also be avoided by one of ordinary skill in the art. For at least these additional reasons, Applicants respectfully request reconsideration and removal of the rejection of claims 10 and 12 of the present application.

New claims 17 and 19 require the hollow cathode sputtering target to be cup-shaped and have a rim defining an open mouth of a predetermined diameter. In addition, the depth of the cup-shaped hollow cathode sputtering target is required to be at least as great as the predetermined diameter. No new matter was added. For example, see page 4, line 30, of the present application, as filed, for reference to “cup shape”; page 5, line 30, for “peripheral edge 2” (i.e., rim); and FIG. 1 for a clear disclosure of a rim/peripheral edge (2) which defines an open mouth of a predetermined diameter. Also, FIG. 1 clearly discloses that the target depth is at least as great as the diameter of the open mouth of the hollow cathode target. Applicants respectfully submit that Marx et al. and JP ‘461 fail to disclose or render obvious a method for packaging the sputtering target required by claims 17 and 19.

New claims 18 and 19 require the hollow cathode sputtering target to be cup-shaped and have a rim (peripheral edge (2)) defining an open mouth and require the cover to consist of a transparent, rigid, flat plate with through-holes extending transversely through the flat plate. In addition, the flat plate is required to be supported on and contact only the rim (peripheral edge (2)) of the cup-shaped hollow cathode sputtering target and not to extend below the rim. No new matter was added. For example, see page 5, lines 7-13, of the present application, as filed, for a disclosure of a transparent rigid, flat plate, and see FIG. 1 for a disclosure of a flat plate (5) supported on and contacting only the rim (peripheral edge (2)) of the cup-shaped hollow cathode sputtering target. In FIG. 1, the flat plate (5) clearly does not extend below the rim (i.e.,

peripheral edge (2)). Applicants respectfully submit that Marx et al. and JP '461 fail to disclose or render obvious a method of packaging a hollow cathode sputtering target as required by claims 18 and 19.

It should be noted that a flat plate cover would never be used by one of ordinary skill in the art to protect the targets of Marx et al. or JP '461 because such a cover would contact and damage the erosion face and/or periphery thereof which is undesirable.

Accordingly, Applicants respectfully request reconsideration and removal of the §103(a) rejection.

## **II. Conclusion**

In view of the above amendments and remarks, Applicants respectfully submit that the rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

Please charge any deficiency or credit any overpayment for entering this Amendment to our deposit account no. 08-3040.

Respectfully submitted,  
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